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January 10, 2011

Ms. Sabrina Forrest
U.S. Environmental Protection Agency, Region 8
Mail Code: 8EPR-B
1595 Wynkoop Street
Denver, Colorado 80202-1129

SUBJECT: START 3, EPA Region 8, Contract No. EP-W-05-050, TDD No. 1008-13
Trip Report, Upper Animas Mining District, Silverton, San Juan County, Colorado

Dear Ms. Forrest:

Attached is one copy of the trip report for sampling activities conducted for the Upper Animas Mining District Site Reassessment. Activities included surface water, sediment, and soil sampling. Field activities were conducted from October 25, 2010 through November 1, 2010. This document is submitted for your approval.

If you have any questions, please call me at 303-291-8264.

Sincerely,

URS OPERATING SERVICES, INC.

Megan Dudevoir
Project Manager

cc: Charles W. Baker/UOS (w/o attachment)
File/UOS

EPA ACTION BLOCK

- [x] Approved
- [ ] Approved, TDD to follow
- [ ] Approved as corrected
- [ ] Disapproved
- [ ] Review with _____
- [ ] Original to _____
- [ ] Copy to _____
- [ ] Reply envelope enclosed

01/18/11 Sabrina Forrest
Date By

TRIP REPORT
Upper Animas Mining District
Silverton, San Juan County, Colorado

1.0 INTRODUCTION

URS Operating Services, Inc. (UOS), was tasked by the Environmental Protection Agency (EPA), under the Superfund Technical Assessment and Response Team 3 (START) contract # EP-W-05-050 Technical Direction Document (TDD) No. 1008-13, to conduct a site reassessment (SR) at the Upper Animas Mining District site. Specifically, START was tasked to collect as many as 69 surface water samples, 61 sediment samples, and 36 source soil samples, including QA/QC samples. Field activities were completed in accordance with the approved Field Sampling Plan (FSP) (UOS 2010). During the field sampling event 54 surface water samples, 54 sediment samples, and 14 source soil samples were collected; these sample numbers include field duplicate samples.

The site is located in Silverton, San Juan County, Colorado and is made up of publically and privately owned parcels. The investigation focused on the Animas River between U.S. Geological Survey (USGS) gauging stations A72 and A68, Mineral Creek immediately upstream of the Animas River, Cement Creek, and tributaries to Cement Creek (Figure 1) (UOS 2010).

Site activities were conducted from October 25, 2010 through November 1, 2010 and included sample collection along with photo documentation, GPS documentation, and in situ water parameter collection. All water samples were submitted to the EPA Region 8 Environmental Services Assistance Team (ESAT) laboratory for Target Analyte List (TAL) metals analysis. Additionally, sediment samples were submitted to a Contract Laboratory Program (CLP) laboratory for TAL metals and poly-chlorinated biphenyl (PCB) analysis.

2.0 BACKGROUND

Mines in the Silverton area operated between the years 1874 and 1991. Mining activities in the Upper Animas basin, including Cement Creek, produced the waste rock and mill tailings sources from which contamination spread throughout the surface water pathway. This site assessment focused on Cement Creek, a major source of metals contamination to the Animas River.

Thirty-three individual sources of mine wastes have been identified in the Cement Creek drainage, totaling approximately 188,000 cubic yards (UOS 2009). Several investigations have been conducted in the Cement Creek basin by the Colorado Department of Public Health and the Environment (CDPHE),

but data were not appropriate for evaluating the site based on HRS criteria. Several sources of mine waste have been reclaimed to some degree through work carried out by the Bureau of Land Management (BLM), the CDPHE, the Colorado Division of Reclamation Mining and Safety (DRMS), and the Animas River Stakeholders Group (ARSG). The reclaimed waste areas are primarily in gulches that feed into lower Cement Creek. Most of the sources of mine wastes in the Upper Cement Creek basin remain in place. The wastes are rich in arsenic, cadmium, copper, lead, manganese, and zinc.

During the October 2010 sampling event, START aimed to characterize the impact of most tributaries on Cement Creek, and the impact of Cement Creek on the Animas River.

The purpose of this SR sampling event was to assist the Region 8 EPA in gathering data to determine whether this site should be considered for National Priority List (NPL) listing.

3.0 SITE ACTIVITIES

START members Megan Dudevoir, Bryan Williams, Andrew Longworth, and Nathan Williams mobilized to the site on October 25, 2010. START members collected 50 surface water samples, 54 sediment samples, 14 soil samples, and 4 adit water samples over the course of 8 days. The location of each sample was documented by collecting a GPS point. All sample locations, parameters, collection time, and collection date were entered into a site database. Sample containers were labeled, placed in coolers with ice, and kept under chain of custody. In the first 2 days of sampling, October 25 and 26, 2010, the temperatures were below freezing for the entire day, and snow fell throughout the day. In the higher elevations, as much as 1.5 feet of snow fell. In the remaining days of the field event, mid-day temperatures exceeded 32 degrees and START observed snow melt running into Cement Creek and its tributaries.

Site photos are provided in Appendix A.

4.0 SAMPLING AND ANALYSIS

Samples were collected in accordance with the approved FSP, with exceptions and justifications noted in Section 5.0 of this report. START personnel collected three duplicate and Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples for water and soil/sediment. Duplicate and MS/MSD samples were collected for samples UASW005, UASE005, UASW019, UASE019, UASW035, and UASE035. Surface water samples were hand-delivered to the EPA Region 8 ESAT Laboratory located in Golden, Colorado,

on November 2, 2010. Sediment and soil samples for PCB and total metals analysis were shipped via FedEx to the following CLP laboratory on November 2, 2010:

ALS Laboratory Group
960 West LeVoy Drive
Salt Lake City, Utah, 84123

Samples were received in good condition with custody seals intact. Approximate sample locations are illustrated in Figures 2 and 3 of the approved FSP.

4.1 SOIL SAMPLING

Soil samples were collected for total metals and PCB analysis. All of the soil samples were source samples and were collected in accordance with procedures described in UOS TSOP 4.16, "Surface and Shallow Depth Soil Sampling" (UOS 2005). Dedicated, disposable plastic scoops were used for source sample collection. All source samples were collected as biased grab samples from the 6- to 12-inch depth interval, with the exception of UASO001 and UASO002, which are described in Section 5.0 of this report. A sharp shooter shovel was used to accomplish the depth needed for the sample and was decontaminated between samples. Soil samples for total metals analysis were placed in 8-ounce high density polyethylene (HDPE) jars. Soil samples for PCB analysis were placed in 8-ounce amber glass jars. All samples were labeled with the sample identification number and stored in a cooler on ice pending shipping to the laboratory. Sample descriptions were logged in the field log book. A GPS point and photograph were collected for each sample location.

4.2 SURFACE WATER SAMPLING

Surface water samples (including adit water) were collected for total and dissolved metals analysis. Surface water sampling for total metals was conducted by facing upstream and immersing the 500 mL HDPE sample bottle directly into the sample media. Surface water sampling for dissolved metals was conducted by immersing a length of HDPE tubing in the sample media. Water was drawn through a 0.45 micron filter and into the 500 mL HDPE sample bottle using a peristaltic pump. Sample bottles and filters were certified pre-cleaned by the provider, and water was drawn through the tubing and discarded prior to sample collection to ensure contamination was not introduced by sampling supplies. Samples were preserved with nitric acid. UOS measured field parameters, including pH, temperature, and electrical

conductivity, of each sample. Field instrumentation was calibrated daily, and all calibration and field data was recorded in the field log book. Sampling was conducted from the farthest downstream location to the farthest upstream location to minimize the potential for cross-contamination. All surface water sample locations were photographed, recorded with GPS, and documented in the field log book during sampling activities.

4.3 SEDIMENT SAMPLING

Sediment samples were collected for total metals and PCB analysis. Sediment sampling was conducted according to UOS TSOP 4.17, "Sediment Sampling" (UOS 2005). Sediment sampling locations corresponded to surface water sampling locations and were collected immediately after the surface water sample was collected, proceeding from the most downstream location to the most upstream location. START attempted to collect primarily fines and avoid gravel, but in some locations fines were not readily available, and the sample contained some larger grains or gravel. Sediment samples were collected using a disposable, dedicated scoop. Total metal samples were placed into 8-ounce HDPE jars, and PCB samples were placed in 8-ounce amber glass jars. Sediment samples were labeled and stored in a cooler on ice pending shipping to the laboratory. All sediment sample locations were photographed, recorded with GPS, and documented in the project log book during sample activities.

5.0 FIELD SAMPLING PLAN DEVIATIONS

The following deviations from the FSP were made in the field based on assessments made by the START project manager and field team members:

- Samples UASW038 and UASE038 (Illinois Gulch) were not collected because the confluence of Illinois Gulch and Cement Creek was located on private property for which START did not have an access agreement.
- Samples UASW048 and UASE048 (Elk Tunnel discharge) were not collected because START personnel could not identify any flow from Elk Tunnel.
- Samples UASW051 and UASE051 (Mammoth Tunnel discharge) were not collected because START personnel could not identify any flow from Mammoth Tunnel.

- Samples UASW053 and UASE053 (Cement Creek downstream of Prospect Gulch) were not collected because they were located on private property for which START did not have an access agreement.
- Samples UASW055 and UASE055 (Cement Creek upstream of Prospect Gulch) were not collected because they were located on private property for which START did not have an access agreement.
- Samples UASW057 and UASE057 (Dry Gulch discharge) were not collected because START personnel could not identify any flow from Dry Gulch.
- The planned location for samples UASW011 and UASE011 was below all of the Gold King 7 Level waste piles. These samples were instead collected where runoff from the upper piles crosses the mine access road. The planned location could not be safely accessed at the toe of the lower piles due to an extremely steep slope, loose material, and snow.
- In addition to adit water, sediment samples were collected from adit discharge points, as START determined it would provide additional information.
- Fewer soil samples than planned were collected. START personnel dug below snow in several locations on each pile and preformed XRF analysis of the driest soil in the hole. In-situ XRF analysis showed waste piles were more homogeneous that expected, so the number of samples required for characterization was reduced. Sample location identification numbers for soil samples were changed in the field to number them sequentially as they were collected. Soil sample identifications are as follows
    - UASO01: American Tunnel
    - UASO02: American Tunnel
    - UASO03: Red and Bonita Mine – top pile
    - UASO04: Red and Bonita Mine – middle pile
    - UASO05: Red and Bonita Mine – bottom pile
    - UASO06: Mogul North Mine waste pile
    - UASO07: Grand Mogul stope – west side
    - UASO08: Grand Mogul stope – east side

- UASO09: Grand Mogul Mine waste piles – east side
- UASO10: Grand Mogul Mine waste piles – center
- UASO11: Grand Mogul Mine waste piles – west side
- UASO12: Mogul Mine waste piles – west side
- UASO13: Mogul Mine waste piles – adjacent to shed
- UASO14: Mogul Mine waste piles – east side

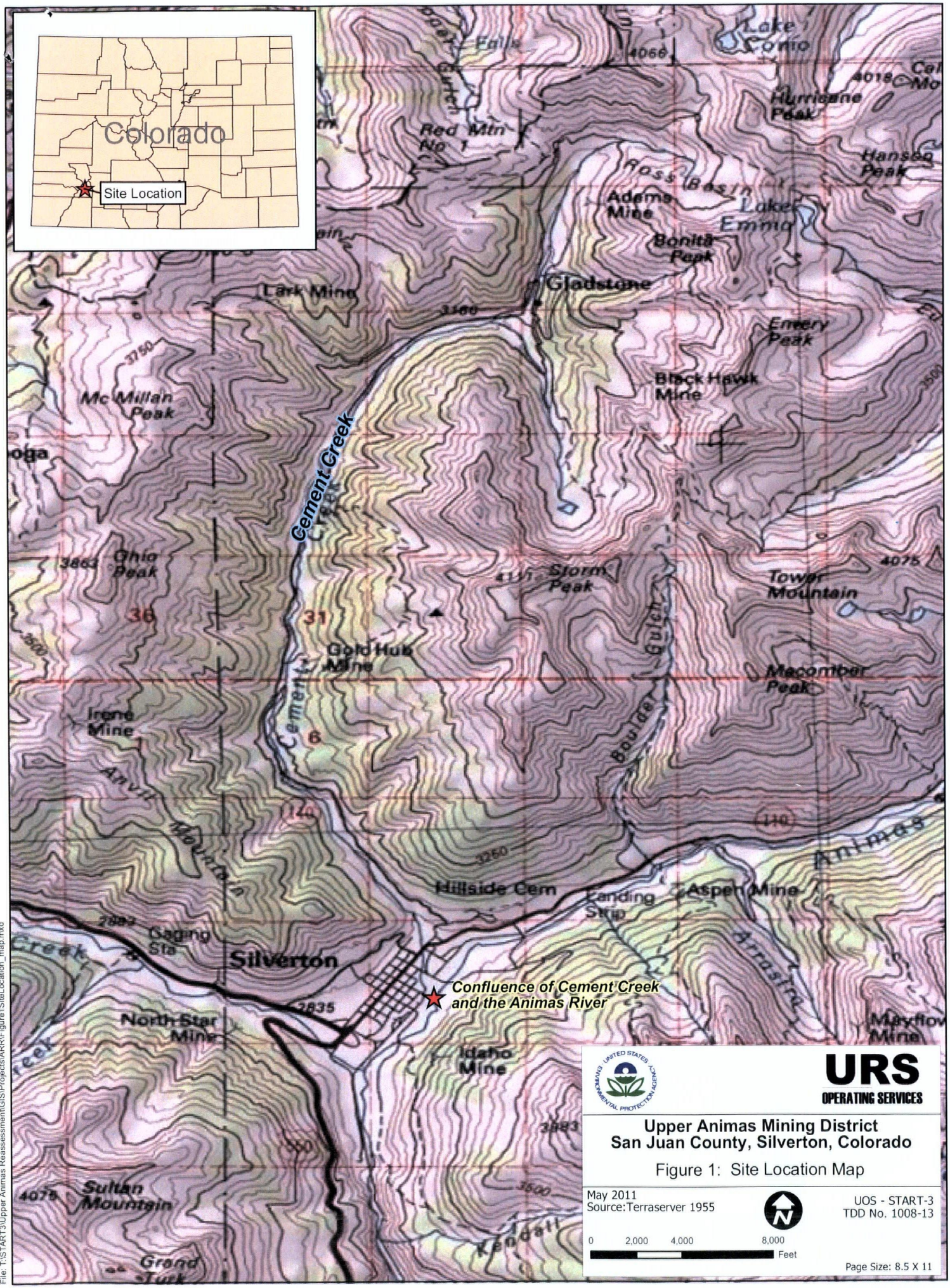
- Soil samples collected in the vicinity of the American Tunnel, UASO001 and UASO002, were obtained from 0 to 1 inch because the ground was frozen and the planned depth of 6 inches could not be obtained.
- Soil samples were not collected at the Gold King 7 Level Mine because the waste piles for which START had an access agreement could not be accessed due to unsafe conditions, including extremely steep slope, loose waste rock material, and snow.
- A sediment sample for PCB analysis was not collected at UASE059 (at the toe of Grand Mogul Mine) because there was not enough sediment available for both metals and PCB analysis. Metals analysis was deemed more critical to project goals.
- A sediment sample for PCB analysis was not collected at UASE012 (above Gold King 7 Level Mine) because there was not enough sediment available for both metals and PCB analysis. Metals analysis was deemed more critical to project goals.
- A sediment sample for PCB analysis was not collected at UASE030 (Cement Creek upstream of Grand Mogul Mine) because there was not enough sediment available for both metals and PCB analysis. Metals analysis was deemed more critical to project goals.
- Sample AD005 was not collected because there is no adit discharge from Grand Mogul Mine.
- Surface water and sediment samples were not collected at locations 025, 026, 027, 028, and 031 because START was not able to reach the highest elevations due to snowy and potentially unsafe conditions.
- Soil samples were not collected from the Queen Anne Mine, the Adelphin Mine, and the Columbia Mine because START was not able to reach the highest elevations due to snowy and potentially unsafe conditions.

6.0 LIST OF REFERENCES

URS Operating Services, Inc. (UOS). 2005. "Technical Standard Operating Procedures for the Superfund Technical Assessment and Response Team (START), EPA Region 8."

URS Operating Services, Inc. (UOS). 2009. "Data Gap Analysis Report for Targeted National Priority Listing: Upper Animas Mining District San Juan County Colorado." October 13, 2009.

URS Operating Services, Inc. (UOS). 2010. "Field Sampling Plan: Upper Animas Mining District San Juan County Colorado." October 21, 2010.



Created: May 3, 2011 10:41:27 AM Drawn by: Jeremiah_Ervin
File: T:\START3\Upper Animas Reassessment\GIS\Projects\AR\Figure1SiteLocation_map.mxd

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Upper Animas Mining District
San Juan County, Silverton, Colorado

Figure 1: Site Location Map

May 2011
Source:Terraserver 1955

UOS - START-3
TDD No. 1008-13

0 2,000 4,000 8,000 Feet

Page Size: 8.5 X 11

TARGET SHEET

EPA REGION VIII

SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOCUMENT NUMBER: 1260056

SITE NAME: UPPER CEMENT CREEK, UPPER ANIMAS MINING DISTRICT

DOCUMENT DATE: 01/10/2011

DOCUMENT NOT SCANNED

Due to one of the following reasons:

☐ PHOTOGRAPHS

☐ 3-DIMENSIONAL

☑ OVERSIZED

☐ AUDIO/VISUAL

☐ PERMANENTLY BOUND DOCUMENTS

☐ POOR LEGIBILITY

☐ OTHER

☐ NOT AVAILABLE

☐ TYPES OF DOCUMENTS NOT TO BE SCANNED
(Data Packages, Data Validation, Sampling Data, CBI, Chain of Custody)

DOCUMENT DESCRIPTION:

MAP - OCTOBER 2010 SAMPLES

Contact the Superfund Records Center to view available document.
(303) 312-6473

APPENDIX A

Photolog

Photo 1
Collection of UASW029 and UASE029 (Animas River downstream of Silverton).

Photo 2
Collection of UASW032 and UASE032 (Animas River downstream of Mineral Creek).

Photo 3
Collection of UASW034 and UASE034 (Animas River upstream of Mineral Creek).

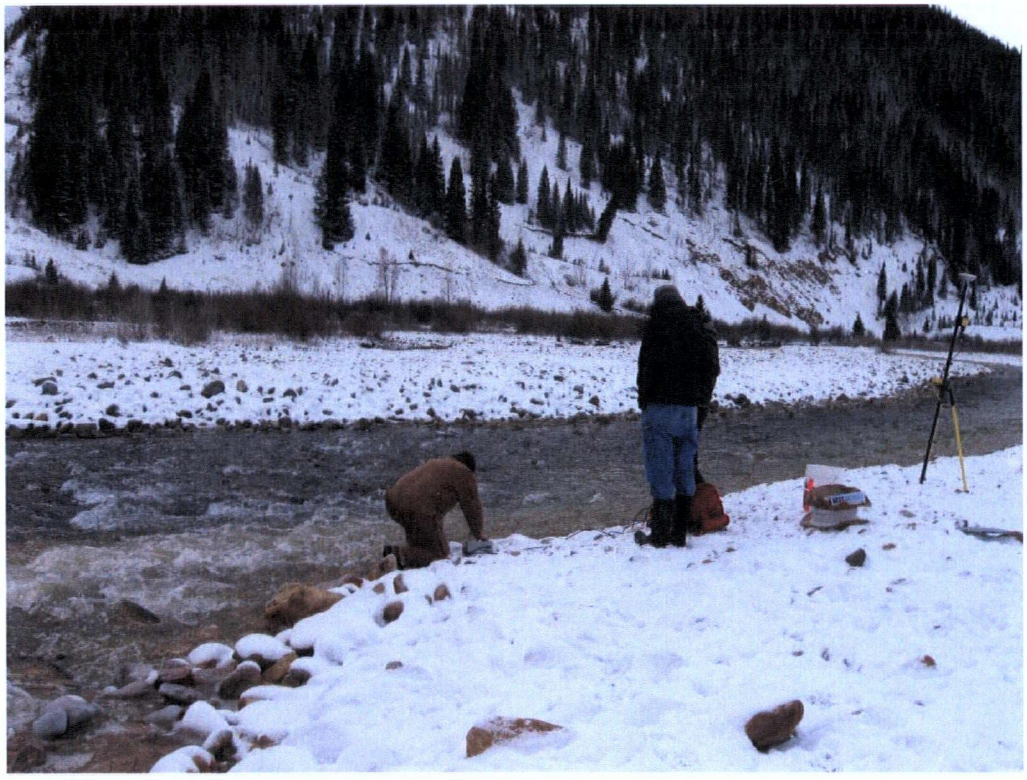

Photo 4
Collection of UASW001 and UASE001 (Animas River downstream of Cement Creek).

Photo 5
Collection of UASW002 and UASE002 (Cement Creek upstream of Animas River).

Photo 6
Collection of UASW003 and UASE003 (Animas River upstream of Cement Creek).

Photo 7
Collection of UASW035 and UASE035 (Cement Creek downstream of Kendrick Smelter).

Photo 8
Collection of UASW036 and UASE036 (Cement Creek upstream of Kendrick Smelter).

Photo 9
Collection of UASW037 and UASE037 (Cement Creek downstream of Illinois Gulch).

Photo 10
Collection of UASW039 and UASE039 (Cement Creek upstream of Illinois Gulch, and downstream of Ohio Gulch).

Photo 11
Location of UASW040 and UASE040 (Ohio Gulch discharge).

Photo 12
Collection of UASW041 and UASE041 (Cement Creek upstream of Ohio Gulch).

Photo 13
Collection of UASW042 and UASE042 (Cement Creek downstream of Anglo Saxon Mine).

Photo 14
Collection of UASW044 and UASE044 (Cement Creek upstream of Anglo Saxon Mine and downstream of Minnesota Gulch).

Photo 15
Collection of UASW043 and UASE043 (discharge from Anglo Saxon Mine).

Photo 16
Collection of UASW045 and UASE045 (discharge from Minnesota Gulch).

Photo 17
Collection of UASW046 and UASE046 (Cement Creek upstream of Minnesota Gulch).

Photo 18
Collection of UASW047 and UASE047 (Cement Creek downstream of Elk Tunnel and Fairview Gulch).

Photo 19
Collection of UASW049 and UASE049 (Cement Creek downstream of Georgia Gulch).

Photo 20
Collection of UASW050 and UASE050 (Cement Creek upstream of Georgia Gulch).

Photo 21
Collection of UASW054 and UASE054 (discharge from Prospect Gulch).

Photo 22
Collection of UASW056 and UASE056 (Cement Creek downstream of Dry Gulch).

Photo 23
Collection of UASW058 and UASE058 (Cement Creek upstream of Dry Gulch).

Photo 24
Collection of UASW004 and UASE004 (Cement Creek downstream of the confluence with the south fork of Cement Creek).

Photo 25
Collection of UASW006 and UASE006 (Cement Creek upstream of the confluence with the south fork of Cement Creek).

Photo 26
Collection of UASW005 and UASE005 (south fork of Cement Creek).

Photo 27
Collection of UASW007 and UASE007 (American Tunnel discharge, immediately upstream of Cement Creek).

Photo 28
Collection of UAAD001 (discharge from the American Tunnel).

Photo 29
Collection of UASW008 and UASE008 (Cement Creek upstream of the American Tunnel).

Photo 30
Collection of UASW009 and UASE009 (Cement Creek downstream of the confluence with the north fork of Cement Creek).

Photo 31
Collection of UASW013 and UASE013 (Cement Creek upstream of the confluence with the north fork of Cement Creek).

Photo 32
Collection of UASW010 and UASE010 (north fork of Cement Creek).

Photo 33
Collection of UASW014 and UASE014 (Cement Creek downstream of Red and Bonita Mine).

Photo 34
Collection of UASW015 and UASE015 (roadside channel below Red and Bonita Mine).

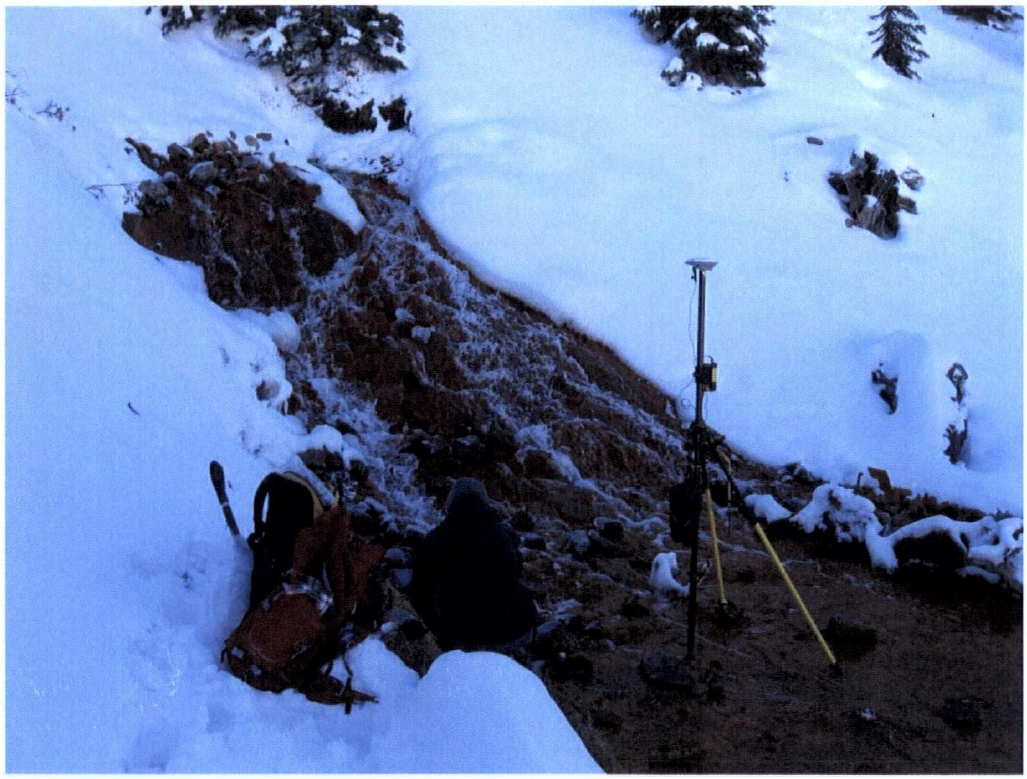

Photo 35
Collection of UAAD003 and UAAD003 (Red and Bonita Mine adit).

Photo 36
Collection of UASW016 and UASE016 (Cement Creek upstream of Red and Bonita Mine).

Photo 37
North fork of Cement Creek – flow is low and area is mostly frozen over.

Photo 38
Collection of UAAD002 (Gold King 7 Level adit).

Photo 39
Collection of UASW011 and UASE011 (north fork of Cement Creek downstream of Gold King 7 Level Mine – at road crossing).

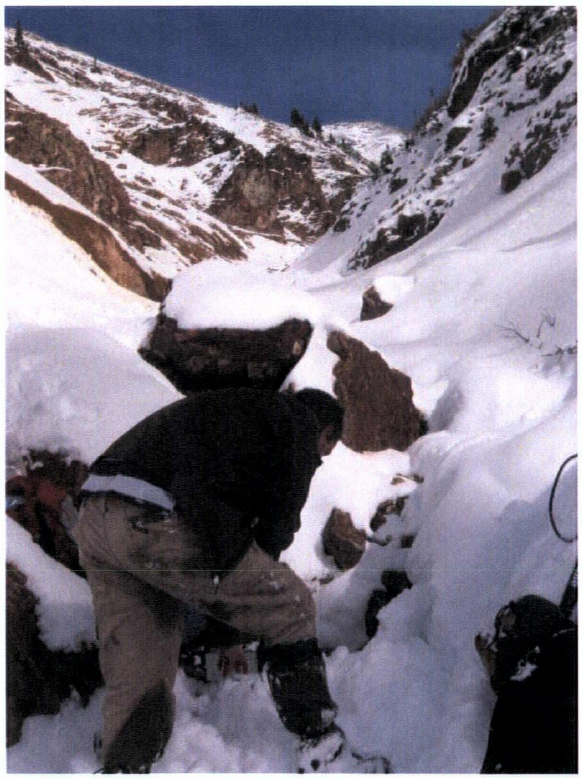

Photo 40
Collection of UASW012 and UASE012 (north fork of Cement Creek upstream of Gold King 7 Level Mine).

Photo 41
Location of UASW017 and UASE017 (Cement Creek downstream of Mogul Mine wetland).

Photo 42
Collection of UASW019 and UASE019 (flow through Mogul Mine wetland).

Photo 43
Collection of UASW018 and UASE018 (Cement Creek upstream of Mogul Mine wetland).

Photo 44
Collection of UASW018 and UASE018 (Cement Creek upstream of Mogul Mine wetland).

Photo 45
Collection of UASW020 and UASE020 (Cement Creek upstream of Mogul Mine).

Photo 46
Collection of UAAD004 (Mogul Mine adit discharge).

Photo 47
Collection of UASO002 (American Tunnel).

Photo 48
Collection of UASO003 (top pile at Red and Bonita).

Photo 49
Collection of UASO004 (middle pile at Red and Bonita).

Photo 50
Collection of UASO005 (bottom pile at Red and Bonita).

Photo 51
Red and Bonita waste piles.

Photo 52
Collection of UASW021 and UASE021 (Cement Creek downstream of Mogul North Mine).

Photo 53
Collection of UASW022 and UASE022 (drainage from of Mogul North Mine).

Photo 54
Collection of UASO006 (Mogul North waste pile).

Photo 55
Seepage from the toe of the Mogul North waste pile.

Photo 56
Collection of UASW023 and UASE023 (Cement Creek upstream of Queen Anne Mine).

Photo 57
Collection of UASW024 and UASE024 (drainage from Queen Anne Mine).

Photo 58
Collection of UASO007 (Grand Mogul Mine stope – west side).

Photo 59
Collection of UASO008 (Grand Mogul Mine stope – east side).

Photo 60
Collection of UASW059 and UASE059 (drainage from Grand Mogul Mine).

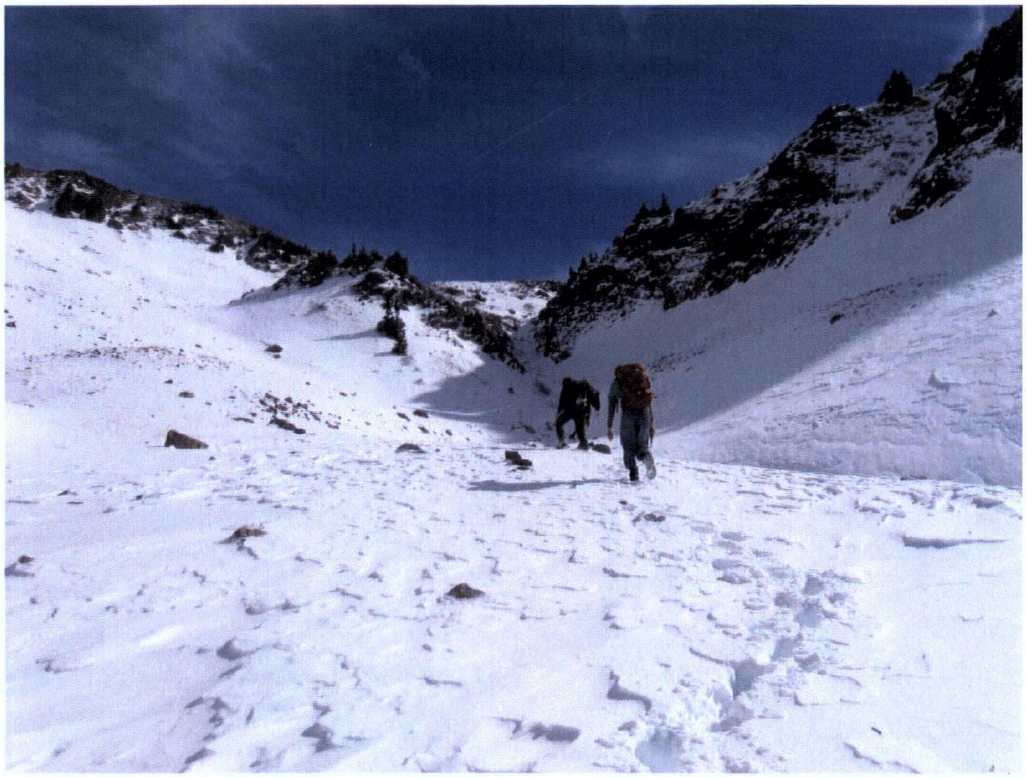

Photo 61
Sample team hiking above Grand Mogul Mine.

Photo 62
Collection of UASW030 and UASE030 (Cement Creek upstream of Grand Mogul Mine).

Photo 63
Grand Mogul Mine and Mogul Mine stope waste piles.

Photo 64
Grand Mogul Mine easternmost waste pile.

Photo 65
Collection of UASO009 (Grand Mogul Mine waste piles – east side).

Photo 66
Collection of UASO010 (Grand Mogul Mine waste piles – center).

Photo 67
Collection of UASO011 (Grand Mogul Mine waste piles – west side).

Photo 68
Collection of UASO012 (Mogul Mine waste piles – west side).

Photo 69
Collection of UASO013 (Mogul Mine waste piles – adjacent to shed).

Photo 70
Collection of UASO014 (Mogul Mine waste piles – east side).

Photo 71
Mogul Mine waste piles.

Photo 72
Treatment pond in the vicinity of the Mammoth Tunnel.

Photo 73
Runoff entering treatment pond in the vicinity of the Mammoth Tunnel.

Photo 74
Steep slope of Gold King 7 Level waste piles.